

## SEARCH REQUEST FORM

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## Search Topic:

Please write a detailed statement of search topic. Describe specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples or relevant citations, authors, keywords, etc., if known. For sequences, please attach a copy of the sequence. You may include a copy of the broadest and/or most relevant claim(s).

Title: HARD MASKING METHOD FOR FORMING  
PATTERNED OXYGEN CONTAINING  
DIASMA ETCHABLE LAYER.

\* SEE CLAIMS & ABSTRACT  
(ATTACHED)

THANKS,

## STAFF USE ONLY

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1. A method for forming a patterned microelectronics layer within a microelectronics fabrication comprising:

providing a substrate employed within a microelectronics fabrication;

forming over the substrate an oxygen containing plasma etchable microelectronics layer;

forming upon the oxygen containing plasma etchable microelectronics layer a hard mask layer;

forming upon the hard mask layer a patterned photoresist layer;

etching through use of a first anisotropic plasma etch method the hard mask layer to form a patterned hard mask layer while employing the patterned photoresist layer as a first etch mask layer, the first anisotropic plasma etch method employing an etchant gas composition appropriate for etching a hard mask material from which is formed the hard mask layer;

etching through use of a second plasma etch method the patterned photoresist layer from the patterned hard mask layer while employing the patterned hard mask layer as an etch stop layer while simultaneously etching the oxygen containing plasma etchable microelectronics layer while employing at least the patterned hard mask layer as a second etch mask layer to form a patterned oxygen containing plasma etchable microelectronics layer, the second plasma etch method employing an oxygen containing etchant gas composition.

2. The method of claim 1 wherein a thickness of the patterned photoresist layer and a thickness of the oxygen containing plasma etchable microelectronics layer are selected such that:

the patterned photoresist layer is completely etched from the patterned hard mask layer;

the oxygen containing plasma etchable microelectronics layer is completely etched to form the patterned oxygen containing plasma etchable microelectronics layer; and

there is attenuated lateral etching of the patterned oxygen containing plasma etchable microelectronics layer.

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microelectronics dielectric layer.

11. The method of claim 9 wherein the microelectronics fabrication is selected from the group consisting of integrated circuit microelectronics fabrications, solar cell microelectronics fabrications, ceramic substrate microelectronics fabrications and flat panel display microelectronics fabrications.

12. The method of claim 9 wherein the oxygen containing plasma etchable microelectronics dielectric layer is formed from an oxygen containing plasma etchable dielectric material selected from the group consisting of organic polymer spin-on-polymer dielectric materials and amorphous carbon dielectric materials.

13. The method of claim 9 wherein the hard mask layer is formed from a hard mask material selected from the group consisting of silicon oxide hard mask materials, silicon nitride hard mask materials and silicon oxynitride hard mask materials.

14. The method of claim 9 wherein the oxygen containing etchant gas composition employs an oxygen containing etchant gas selected from the group consisting of oxygen, ozone, nitrous oxide and nitric oxide.

15. The method of claim 14 wherein the oxygen containing etchant gas composition also employs a sputtering gas component.

16. A microelectronics fabrication having formed therein a patterned oxygen containing plasma etchable microelectronics dielectric layer in accord with the method of claim 1.

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fabrication comprising:

providing a substrate employed within a microelectronics fabrication;

forming over the substrate an oxygen containing plasma etchable microelectronics dielectric layer;

forming upon the oxygen containing plasma etchable microelectronics dielectric layer a hard mask layer;

forming upon the hard mask layer a patterned photoresist layer;

etching through use of a first anisotropic plasma etch method the hard mask layer to form a patterned hard mask layer while employing the patterned photoresist layer as a first etch mask layer, the first anisotropic plasma etch method employing an etchant gas composition appropriate for etching a hard mask material from which is formed the hard mask layer;

etching through use of a second plasma etch method the patterned photoresist layer from the patterned hard mask layer while employing the patterned hard mask layer as an etch stop layer while simultaneously etching the oxygen containing plasma etchable microelectronics dielectric layer while employing at least the patterned hard mask layer as a second etch mask layer to form a patterned oxygen containing plasma etchable microelectronics dielectric layer, the second plasma etch method employing an oxygen containing etchant gas composition.

10. The method of claim 9 wherein a thickness of the patterned photoresist layer and a thickness of the oxygen containing plasma etchable microelectronics dielectric layer are selected such that:

the patterned photoresist layer is completely etched from the patterned hard mask layer;

the oxygen containing plasma etchable microelectronics dielectric layer is completely etched to form the patterned oxygen containing plasma etchable microelectronics dielectric layer; and

there is attenuated lateral etching of the patterned oxygen containing plasma etchable

3. The method of claim 1 wherein the microelectronics fabrication is selected from the group consisting of integrated circuit microelectronics fabrications, solar cell microelectronics fabrications, ceramic substrate microelectronics fabrications and flat panel display microelectronics fabrications.
4. The method of claim 1 wherein the oxygen containing plasma etchable microelectronics layer is formed from an oxygen containing plasma etchable material selected from the group consisting of oxygen containing plasma etchable conductor materials, oxygen containing plasma etchable semiconductor materials and oxygen containing plasma etchable dielectric materials.
5. The method of claim 1 wherein the hard mask layer is formed from a hard mask material selected from the group consisting of metals, metal alloys, metal oxides, metal nitrides, non-metal oxides, non-metal nitrides and composites thereof.
6. The method of claim 1 wherein the oxygen containing etchant gas composition employs an oxygen containing etchant gas selected from the group consisting of oxygen, ozone, nitrous oxide and nitric oxide.
7. The method of claim 6 wherein the oxygen containing etchant gas composition also employs a sputtering gas component.
8. A microelectronics fabrication having formed therein a patterned oxygen containing plasma etchable microelectronics layer formed in accord with the method of claim 1.
9. A method for forming a patterned microelectronics dielectric layer within a microelectronics